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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/807,425	07/03/2001	Satoshi Niyama	206228US0PCT	6245

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EXAMINER

SADULA, JENNIFER R

ART UNIT	PAPER NUMBER
1756	7

DATE MAILED: 12/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

<b>Application No.</b> 09/807,425	<b>Applicant(s)</b> NIYAMA ET AL
<b>Examiner</b> Jennifer R. Sadula	<b>Art Unit</b> 1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 4/3/2001, 10/18/2001, 5/28/2002.
- 2a)  This action is **FINAL**.
- 2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 1-23 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-23 is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on 03 April 2001 is/are: a)  accepted or b)  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11)  The proposed drawing correction filed on \_\_\_\_\_ is: a)  approved b)  disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12)  The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All b)  Some \* c)  None of:
    - 1.  Certified copies of the priority documents have been received.
    - 2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    - 3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.
- 14)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
  - a)  The translation of the foreign language provisional application has been received.
- 15)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5, 6.
- 4)  Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5)  Notice of Informal Patent Application (PTO-152)
- 6)  Other:

## DETAILED ACTION

### *Information Disclosure Statement*

The information disclosure statement (IDS) submitted on 18 October 2001 has been considered by the examiner. However, the examiner wishes to note that these references merely submitted with English translations of an abstract have only been considered on the merits of that which was in English and no more. Any reference without an English language translation, yet cited herein was fully considered on the merits of a translation available to the examiner.

### *Drawings*

The drawings are objected to because it is not clear what 4 is pointing to in figure 2. Further, it is unclear to the Examiner what figure 3 is depicting and the brief description does not further the capability of understanding such. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Specification*

The disclosure is objected to because of the following informalities: it is unclear to the Examiner what figure 3 is depicting and the brief description does not further the capability of understanding such. Appropriate correction is required.

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***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6-9 and 17-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites the limitation "the curable compound" in line 2. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-10, 14-17 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Hikmet et al., EP 0 562 681A1 ("Hikmet").

Hikmet discloses a piezoelectric material comprising a liquid crystalline (LC) polymer network formed by means of photopolymerization of the LC monomer and a chiral material

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(abstract). The polymer network preferably has a smectic structure (1:6-7) whereas the resultant material may exhibit cholesteric and/or chiral smectic phases and ferroelectric properties in a multi-domain structure (1:30-32). Applicants' attention is drawn to figure 1 depicting the monomers whereas the X groups are shown in figure 2 and the mesogenic M groups are shown in figure 3. Thus the assertion is that figure 1 of the present application, which embodies the composition as broadly limited within the claims, is a combination of elements of figures 1-3 of Hikmet wherein the first formula is utilized in accordance with the second option of figure 2 and the second mesogen of figure 3, thereby making the compound a diacrylate as shown.

Additional LC materials are noted in column 3, lines 23-31 of Hikmet.

Figure 4 of Hikmet shows the chiral compounds being further polymerizable and of a different molecular weight. For purposes of examination, the "curable compound" is the polymerizable portion of the monomeric structures.

Claims 1-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Hasebe et al., U.S. Patent No. 5,863,457 ("Hasebe").

Hasebe teaches a polymerizable liquid crystalline composition of formula I wherein when  $n=0$  and  $Y^1$  is a bond, the presently claimed invention is anticipated. Hasebe further teaches the use of optically active chiral groups which do not contain a mesogenic sub unit wherein the pitch is adjustable in the range of 0.1-60 $\mu$ m (13:63-14:8). Particular attention is drawn to the preparation processes in column 20.

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Claims 1-10, 14-17 and 21-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Hikmet et al., U.S. Patent No. 6,171,518 ("Hikmet II").

Hikmet II teaches a method of preparing a cross-linked macroscopically oriented LC polymer network which comprises the steps of orienting and polymerizing a LC composition (abstract). Suitable examples of LC monomers satisfy the formula  $Y-X^1-L^1-M-L^2-X^2-Y$  wherein Y can be an assortment of polymerizable groups including acrylates (thereby making the resultant compound a diacrylate if warranted); the X's are spacer units which may be interrupted by one or more oxygen units; the L linking groups may be meth- or oxygen groups and the mesogen may be, among other selections,  $M^1-M^2$  wherein the M's may represent 1,4-phenylene groupings (3:48-4:21).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Hikmet or Hikmet II, each as applied above and both further in view of Hasebe.

Hikmet discloses a piezoelectric material comprising a liquid crystalline (LC) polymer network formed by means of photopolymerization of the LC monomer and a chiral material (abstract). The polymer network preferably has a smectic structure (1:6-7) whereas the resultant

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material may exhibit cholesteric and/or chiral smectic phases and ferroelectric properties in a multi-domain structure (1:30-32).

Hikmet II teaches a method of preparing a cross-linked macroscopically oriented LC polymer network utilizing LC monomers satisfying the formula  $Y-X^1-L^1-M-L^2-X^2-Y$  wherein Y can be an assortment of polymerizable groups including acrylates (thereby making the resultant compound a diacrylate if warranted); the X's are spacer units which may be interrupted by one or more oxygen units; the L linking groups may be meth- or oxygen groups and the mesogen may be, among other selections,  $M^1-M^2$  wherein the M's may represent 1,4-phenylene groupings (3:48-4:21).

However, although it would be understood by one of ordinary skill in the art, neither Hikmet reference specifically discloses the pitch of the chiral compounds utilized.

Hasebe teaches a polymerizable liquid crystalline composition of formula I wherein when  $n=0$  and  $Y^1$  is a bond, the presently claimed invention is anticipated. Hasebe further teaches the use of optically active chiral groups which do not contain a mesogenic sub unit wherein the pitch is adjustable in the range of  $0.1-60\mu\text{m}$  (13:63-14:8).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to make either the piezoelectric device of Hikmet or the optical device of Hikmet II with the chiral compounds of Hasebe as both Hikmet references teach the utilization of such chiral compounds in the final composition however Hasebe teaches the specific pitch and gap of such components. It is further noteworthy that Hasebe also discloses specific methods of making such devices in a step-by-step process.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer R. Sadula whose telephone number is 703.305.4835.

The examiner can normally be reached on Monday through Friday, 10am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff can be reached on 703.308.2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9310 for regular communications and 703.872.9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.



**MARK F. HUFF  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700**

JRS  
December 16, 2002